

Digits LESSON 3-5

9/18/2019

"Zero" & NEGATIVE EXPONENTS

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Goal: I will be able to understand "zero" exponent and negative exponents.

Tool Bag
Formulas, equations,
Vocabulary, etc.

Here's How... Notes & Examples

Simplify

$$\frac{4^3}{4^3} = \frac{4 \cdot 4 \cdot 4}{4 \cdot 4 \cdot 4} = 1$$

$$\frac{4^3}{4^3} = 4^{3-3} = 4^0$$

$$4^0 = 1$$

$12 = 7+5$
 $12 = 14-2$
 $\frac{12}{7+5} = \frac{12}{14-2}$

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$$\frac{x^6}{x^6} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = 1$$

$$\frac{x^6}{x^6} = x^{6-6} = x^0 = 1$$

Rule for "zero" Exponent

$$x^0 = 1$$

③

Examples

a) $\frac{x^{28}}{x^{28}} = x^{28-28} = x^0 = 1$

b) $\frac{5^4}{5^{10} \cdot 5^6} = \frac{5^{16}}{5^{10+6}} = \frac{5^{16}}{5^{16}} = 5^{16-16} = 5^0 = 1$

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Simplify

$$\frac{8^3}{8^5} = \frac{\cancel{8} \cdot \cancel{8} \cdot \cancel{8}}{\cancel{8} \cdot \cancel{8} \cdot \cancel{8} \cdot 8 \cdot 8} = \frac{1}{8^2}$$

equal

$$\frac{8^3}{8^5} = 8^{3-5} = 8^{-2} = \frac{1}{8^2}$$

$$\frac{x^3}{x^6} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x} = \frac{1}{x \cdot x \cdot x} = \frac{1}{x^3}$$

$$\frac{x^3}{x^6} = x^{3-6} = x^{-3} = \frac{1}{x^3}$$

⑤

Rule for Negative Exponents

$$x^{-a} = \frac{1}{x^a}$$

a) $\frac{2^8}{2^{11}} = 2^{8-11} = 2^{-3} = \frac{1}{2^3}$

b) $\frac{10x^{30}}{20x^{70}} = \frac{10}{20} \cdot \frac{x^{30}}{x^{70}} = \frac{1}{2} x^{30-70} = \frac{1}{2} x^{-40}$

$$\frac{1}{2} x^{-40} = \frac{1}{2} \cdot \frac{1}{x^{40}} = \frac{1}{2x^{40}}$$